LOL-HECO-IR-68

Ref: "Stated another way, the historical data will represent yesterday's transmission system, rather than the present and future transmission system. The usefulness of probabilistic based approaches is therefore limited to one degree or another because of this, and while the use of probabilistic based planning is likely to increase in the future, the deterministic approach to system remains the best method of identifying needed system improvements." (T-3, page 19, line 20 though page 20, line 1)

Question(s):

a. Please state all course work, articles written, talks given, testimony given and all other expertise that witness T-3 has in probabilistic based approaches, probability, statistics, confidence intervals, variance, covariance, and statistical robustness.

b. Since all probabilities are based on historic data, do you believe that probability analysis in inherently weaker than non-probabilistic analysis?

c. Are you familiar with any studies that analyze the cost/benefit of using deterministic vs. probabilistic analysis?

HECO Response:

a. The application of probability-based analysis techniques to engineering problems was taught as part of the curricula for obtaining the BSEE degree when Mr. Pollock obtained the degree in 1972. Since that time, he has used the knowledge so gained to complete various projects and studies. Mr. Pollock has not written any articles, given talks or testimony specifically on the subject of probability or statistical based approaches to engineering projects.

b. Probability analysis is neither weaker nor stronger than the deterministic method. Rather, one must use the correct analysis tool for the job at hand. Probability values can be calculated for various events based on historical data. The degree of confidence that one may have in a particular value (for predicting future performance) will depend on how many occurrences of the event are included in the database, and over what time period. With

respect to electrical system planning, and as explained in various places in Mr. Pollock's testimony (HECO T-3), one of the objectives of the system planning process is to complete the technical analysis consistent with previously approved planning criteria, such as the HECO or NERC planning criteria. The planning criteria provide direction for identification of the various outage scenarios to be studied and performance requirements for the system during various events. The planning criteria are deterministic, or rule based, and have been developed through industry experience operating the electrical system. The intent of the application of these criteria is to produce an operable and reliable power system, based on industry wide planning and operating experience. In very complex power systems such as the mainland interconnected systems, probability analysis may assist in identifying and analyzing some multiple contingency scenarios. As noted in Mr. Pollock's response to LOL-HECO-IR-67, the Oahu 138kV system is simpler and less complex than the mainland interconnected grid, and in the case of Kamoku – Pukele, applying probability analysis to aid in the evaluation of multiple contingencies to determine compliance with the planning criteria, would not be beneficial.

c. Due to the increasing complexity of the interconnected mainland power system, there continues to be industry interest in applying probabilistic planning methods, not as a replacement to deterministic methods, but rather as an additional analysis tool. Please see the response to subpart b. above. Mr. Pollock is not familiar with specific studies that compare the cost/benefits of the use of probabilistic vs. deterministic methods for transmission system planning.